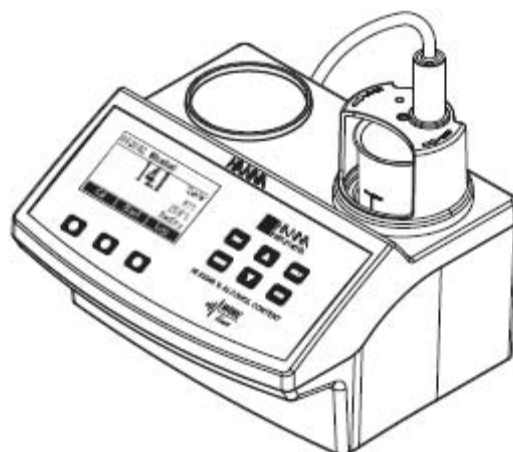


Instruction Manual

HI 83540 Alcohol in Wine Meter



Dear Customer,

Thank you for choosing a Hanna product. This manual will provide you with the necessary information for the correct use of the instrument. Please read it carefully before using the meter. If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com.

This instrument is in compliance with **CE** directives.

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MODEL IDENTIFICATION

Two models are available:

HI 83540-01 - 115 Vac power supply

HI 83540-02 - 230 Vac power supply

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PRELIMINARY EXAMINATION

Please examine this product carefully. Make sure the instrument is not damaged. If any damage occurred during shipment, please notify your Dealer.

Each HI 83540 instrument is supplied complete with:

- Reagents for 50 tests
- One 60 mL plastic syringe
- One 30 mL plastic syringe
- One 100 mL beaker
- One HI 76315 Alcohol probe
- One stir bar
- AC/DC power adapter
- Instruction manual

Note: Save all packing material until you are sure that the instrument works correctly. Any defective item must be returned in its original packing.

GENERAL DESCRIPTION

The HI 83540 is a low cost, easy to use, alcohol meter that benefits from Hanna's years of experience as manufacturer of analytical instruments.

The instrument employs a new method to measure the alcohol content in wines that is both simple and quick. The meter takes two readings, one before the Hanna reagent is added and one after. The difference between measurements is used to calculate the alcohol content.

The meter features a user friendly graphical interface that guides the user through the procedure step by step.

At the end of the measurement, the alcohol content of the wine sample is displayed directly on the LCD.

The HI 83540 meter utilizes a state of the art method for alcohol content determination in wine samples, suitable for anyone.

SIGNIFICANCE OF USE

The alcohol content is an important parameter of a wine. The first and most important criteria for classifying the wine into quality classes.

From the quality view, the alcohol content has an important role in the conservation of a wine with time.

From the sensory point of view, the alcohol content influences the power, warmth and sweetness of a wine.

The alcohol content is also used to classify wines for taxation.

The HI 83540 meter measures the alcohol content in a wine sample simply and quickly. The result is displayed in % v/v units.

SPECIFICATIONS

Range	0.0 to 25.0 %v/v
Resolution	0.1 %v/v
Accuracy	
Fixed Sugar compensation	0.7 %v/v for dry and medium-dry wines (less than 12 g/L sugar)
Type Sugar compensation	
Dry range	0.4 %v/v (less than 4 g/L sugar)
Medium-dry range	0.4 %v/v (4 g/L..12 g/L sugar)
Medium-sweet range	0.8 %v/v (12 g/L..45 g/L sugar)
Sweet range	0.8 %v/v (45 g/L..180 g/L sugar)
Sugar Content compensation	
Dry range	0.2 %v/v (less than 4 g/L sugar)
Medium-dry range	0.2 %v/v (4 g/L..12 g/L sugar)
Medium-sweet range	0.4 %v/v (12 g/L..45 g/L sugar)
Sweet range	0.4 %v/v (45 g/L..180 g/L sugar)
Sample volume	60 mL
Temperature Compensation	5-35 °C (41 to 95 °F)
Electrode	HI 76315 Alcohol probe
Stirring speed	900 rpm
Environment	0 to 50 °C (32 to 122 °F); max 95% RH non-condensing
Power supply	12 Vdc adapter (included)
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight	2200 g (77.6 oz.)

Note: The accuracy and repeatability of the measurements can be improved by using precise volume measuring tools (e.g.: pipette).

REQUIRED REAGENTS

<u>Code</u>	<u>Description</u>	<u>Quantity/Test</u>
HI 83540-50	Standard solution	30 mL
HI 83540-51	Electrode cleaning solution	50 mL
HI 83540-55	Calibration standard solution	60 mL

PRINCIPLE OF OPERATION

The alcohol determination is made using a new method. The meter takes two readings, one before the Hanna reagent is added and one after. The difference between readings is used to calculate the alcohol content.

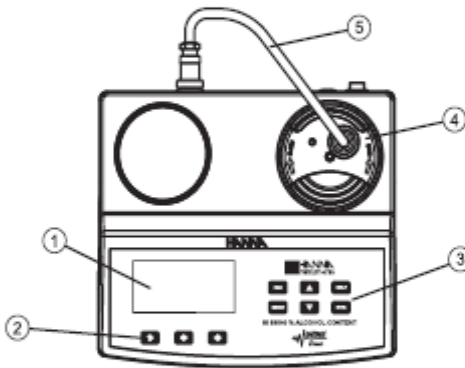
The sugar content of the wine acts as an interference. In order to eliminate the sugar content interference, the meter has a built-in algorithm for sugar content compensation. There are three types of sugar content compensation: Fixed Sugar Compensation (the same compensation for all wine types); Type Sugar Compensation (the wine type can be selected) and Sugar Content Compensation (the sugar content of a wine can be entered).

FUNCTIONAL DESCRIPTION

INSTRUMENT DESCRIPTION

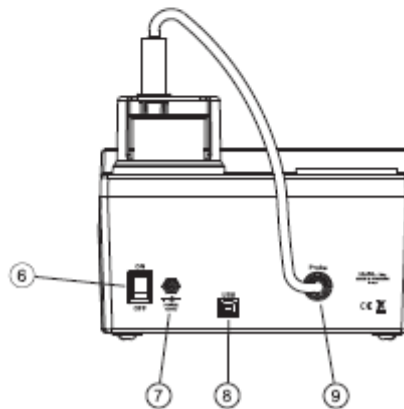
FRONT PANEL

- 1) Graphic LCD
- 2) Functional keys
- 3) Keypad
- 4) Probe holder
- 5) Probe

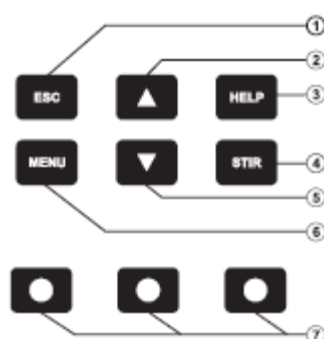


REAR PANEL

- 6) Power switch
- 7) Power input connector
- 8) USB connector
- 9) Probe connector



KEYPAD DESCRIPTION



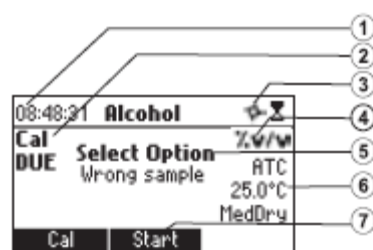
- 1) **ESC** - to leave the current screen and to return to the previous screen. When modifying a parameter in **SETUP** mode, pressing **ESC** will allow you to exit without saving the changes.
- 2) **▲** - to modify a parameter or scroll through information from the instrument's setup
- 3) **HELP** - to access/leave the instrument's contextual help
- 4) **STIR** - to switch ON and OFF the stirrer
- 5) **▼** - to modify a parameter or scroll through information from the instrument's setup
- 6) **MENU** - to enter in menu mode
- 7) Virtual Keys; function changes with displayed screen.

START UP

- Place the instrument on a flat surface. Do not place the instrument in direct sunlight.
- Connect the AC/DC adapter to a power source. Verify correct voltage and frequency is supplied. Connect cable to power input on instrument. See label on rear of instrument.
- Turn the instrument ON using the power switch on the rear panel of the instrument. Wait until main screen is displayed.

GUIDE TO DISPLAY CODES

During the instrument's operation a series of information are displayed on the LCD.



- 1) Current Time
- 2) Calibration due warning/reading status messages
- 3) Stirrer and reading stability status indicator
 - Seen when the reading is unstable.
 - Seen moving when the stirrer is on.
- 4) Measurement unit
- 5) Alcohol content reading/warning and error messages
- 6) Temperature compensation mode, current temperature, sugar compensation setting
- 7) Virtual key functions.

SETUP

To access the Setup screen press the MENU key and then the Setup functional key. While in the Setup menu it is possible to modify the instrument's parameters. Use the ▲/▼ keys to select a parameter from the menu. The Setup screen displays the current configuration. Press Modify to display available options for parameter. Press HELP to view the contextual help at any time.



Calibration timeout

Options: Disabled or 1 to 7 days.

This option is used to set the number of days before the "Alcohol Calibration Expired" warning message appears.

Press Modify to access the calibration timeout setting screen. Press ▲/▼ to increase/decrease the time between calibrations. Press Accept to confirm the value or ESC to return to the Setup menu without saving change.



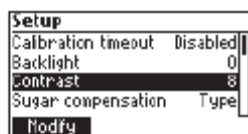
Backlight

Options: 0 to 8.

Press Modify to access the Backlight Setup screen.

Press ▲/▼ or ←/→ in order to increase/decrease the display's backlight intensity.

Press Accept to confirm the value or ESC to return to the Setup menu without saving.



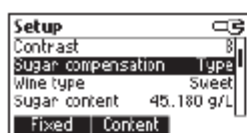
Contrast

Options: 0 to 20.

Press Modify to access the Contrast Setup screen.

Press ▲/▼ or ←/→ in order to increase/decrease the display's contrast.

Press Accept to confirm the value or ESC to return to Setup menu without saving.



Sugar Compensation

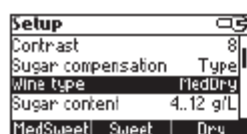
Options: **Fixed**, **Type** or **Content**

Press the corresponding functional key to change the sugar compensation mode.

Press **Fixed** when the sugar information is not available for dry and medium-dry wines (sugar content less than 12 g/L). In case of wine samples with a sugar content over 12 mg/L the accuracy is affected.

Press **Type** when the wine type is known from the sugar content point of view. A wrong estimation, will affect the accuracy.

Press **Content** when the sugar content is known. A wrong estimation, will affect the accuracy.



Wine Type

This option is available only if **Type** was selected as the **Sugar Compensation** mode and it is used to select the wine type.

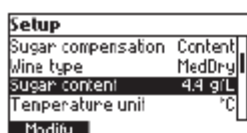
Options: **Dry**, **MedDry**, **MedSweet** or **Sweet**

Press **Dry** for dry wines (1..4 g/L sugar)

Press **MedDry** for medium-dry wines (4..12 g/L sugar)

Press **MedSweet** for medium-sweet wines (12..45 g/L sugar)

Press **Sweet** for sweet wines (more than 45 g/L sugar)



Sugar Content

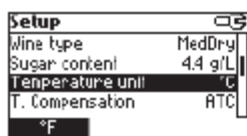
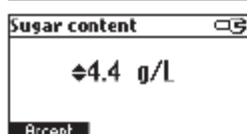
This option is available only if **Content** was selected as the **Sugar Compensation** mode and it is used to set the amount of sugar in wine.

Press **Modify** to access the **Sugar Content** screen.

Press **▲/▼** to increase/decrease the value.

Press **Accept** to confirm the set sugar content.

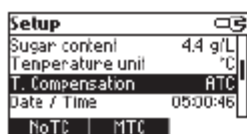
Press **ESC** to return to the **Setup** menu without saving.



Temperature Unit

Option: **°C** or **°F**.

Press the functional key in order to select the desired temperature unit.



Temperature compensation

Options: **ATC**, **NoTC** or **MTC**

Press the functional key to select the desired temperature compensation mode.

Press **ATC** for automatic temperature compensation.

Press **NoTC** if no temperature compensation is desired.

Press **MTC** for manual temperature compensation.

Setup	
Temperature unit	°C
T. Compensation	ATC
Date / Time	05:01:25
Time format	24 hours
Modify	

Date / Time	
YYYY/MM/DD	
2005/04/10	
15:37:25	
Accept	

Setup	
T. Compensation	ATC
Date / Time	05:02:10
Time format	24 hours
Date Format	YYYY/MM/DD
AM/PM	

Setup	
Date / Time	05:02:39
Time format	24 hours
Date Format	YYYY/MM/DD
Beep On	<input checked="" type="checkbox"/>
Modify	

Date Format	
DD/MM/YYYY	
MM/DD/YYYY	
YYYY/MM/DD	
YYYY-MM-DD	
Accept	

Setup	
Time format	24 hours
Date Format	YYYY/MM/DD
Beep On	<input checked="" type="checkbox"/>
Language	English
Disable	

Setup	
Date Format	YYYY/MM/DD
Beep On	<input type="checkbox"/>
Language	English
Instrument ID	0000
Modify	

Language	
English	
Español	
Français	
Italiano	
Accept	

Date/Time

This option is used to set the instrument's date and time.

Press **Modify** to access the date/time screen.

Press \leftarrow/\rightarrow to select the value to be modified (year, month, day, hour, minute or second) and then press $\blacktriangle/\blacktriangledown$ in order to increase/decrease the value.

Press **Accept** to confirm the new values or **ESC** to return to **Setup** menu without saving.

Time format

Options: **AM/PM** or **24 hours**.

Press the functional key in order to select the desired time format.

Date format

Press **Modify** to access the date format screen.

Press $\blacktriangle/\blacktriangledown$ in order to select the desired date format. Press **Accept** to confirm the desired date format or **ESC** to return to the **Setup** menu without saving.

Beep status

Options: **Enable**, **Disable**

This option enables/disables the beep feature.

Press the functional key in order to select the new option.

When enabled, beep sounds as a short beep every time a key is pressed or when the reading must be confirmed.

A long beep alerts that the pressed key is not active.

Language

Options: **English**, **Español**, **Français**, **Italiano**, **Português**

This option is used to change the instrument's display language.

Press **Modify** to access the language screen.

Press $\blacktriangle/\blacktriangledown$ in order to select the desired language. Press **Accept** to confirm the new language or **ESC** to return to **Setup** menu without saving. If the new selected language cannot be loaded, the previously selected language will be kept.

Setup	
Beep On	<input type="checkbox"/>
Language	English
Instrument ID	0000
Meter information	
Modify	

Setup	
Beep On	<input type="checkbox"/>
Language	English
Instrument ID	0000
Meter information	
Select	

HI 83540 Meter Info	
Firmware	1.00
Language	4.0
Fact CAL Date	2006/01/01
Fact CAL Time	01:01:08

Instrument ID

Option: 0 to 9999.

This option is used to set the instrument's ID. The instrument ID is used while exchanging data with a PC.

Meter information

Press Select to view meter information details.

The firmware version, language version, alcohol and temperature factory calibration date and time are displayed. Press ESC to return to the previous screen.

GLP screen

Last Alcohol cal	
Date: 2006/01/01	
Time: 06:49:39	
Cal Expire: Disabled	

Press GLP to view the details from the last user calibration: date, time and Cal. Expire time if this option was selected in Setup.

If there was no user calibration the message "Not Calibrated" appears instead.

Recall screens

Alcohol	Date
1 9.2 %v/v	2006/01/01
2 9.2 %v/v	2006/01/02
3 7.1 %v/v	2007/05/02
4 11.8 %v/v	2007/05/02
Delete All Delete More	

Displays the list of all the logged results. This list includes the record's number, the alcohol value, the unit and the date.

Press ▲/▼ to highlight the stored records.

Delete Record?	
1 9.2 %v/v	2006/01/01
2 9.2 %v/v	2006/01/02
3 7.1 %v/v	2007/05/02
4 11.8 %v/v	2007/05/02
CFM	

Press Delete to erase the currently selected record from the instrument's memory. After pressing Delete the instrument will ask for confirmation. Press CFM to delete the record or ESC to return to the previous screen without deleting.

Deleting a record will reorganize the list.

Delete all records?	
1 9.2 %v/v	2006/01/01
2 9.2 %v/v	2006/01/02
3 7.1 %v/v	2007/05/02
4 11.8 %v/v	2007/05/02
CFM	

Press Delete All to erase all the stored records. After pressing Delete All the instrument will ask for confirmation. Press CFM to delete all the records or ESC to return to the previous screen without deleting.

Record number: 1	
2006/01/01	23:29:21
Alcohol: 9.2%v/v	ATC
Sugar compensation: Type	
Wine type: MedSweet	
Sugar content: 12.45 g/L	

Press More to view the selected record's details: date & time, alcohol content value, sugar compensation type, wine type, sugar content and temperature compensation mode. To return to the previous screen press ESC.

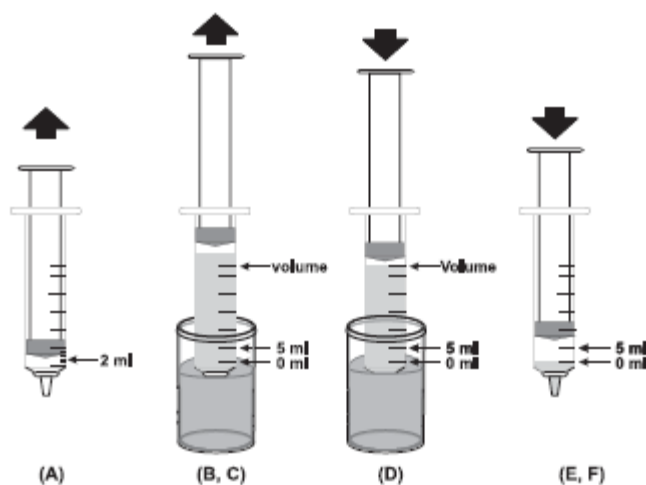
Results	
No Records!	

If the log is empty the message "No Records!" will be displayed.

TIPS FOR AN ACCURATE MEASUREMENT

The instructions below should be followed carefully to ensure the best possible accuracy.

- Rinse the electrode with distilled or deionized water between samples, and blot dry with a lab wipe or other soft absorbent toweling.
- Select the appropriate sugar compensation in Setup (more accurate knowledge of wine sugar content, will yield better accuracy for alcohol content determination).
- Clean the Alcohol probe regularly. Place the alcohol probe in 50 mL of HI 83540-51 cleaning solution and stirr for about 5-10 minutes after 10-15 measurements and always before calibration.
- When dosing wine or reagent with the syringe use the following procedure:



- A) Move the plunger up to 2 mL position.
- B) Immerse the syringe in solution while keeping it in vertical position.
- C) Pull the plunger up until the solution level is over the mark that corresponds to the dosing volume plus about 5 mL. Shake the syringe if any air bubbles are present in the sample.
- D) Push the plunger down until the lower edge of the sample reaches the mark that corresponds exactly to the dosing volume.
- E) Move the syringe above the beaker.
- F) Dose the volume pushing the plunger down until the lower edge of the sample reaches the 0 mL mark.

CALIBRATION PROCEDURE

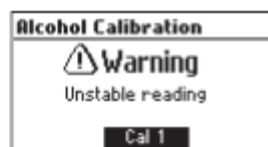
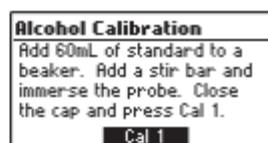
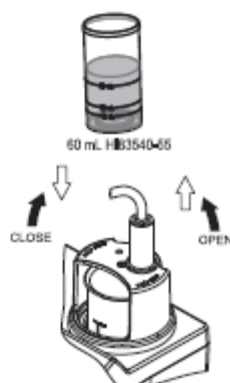
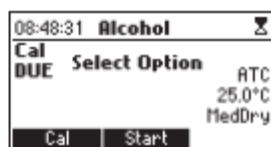
- Turn the instrument ON by pressing the ON/OFF switch.
- When "Select option" message is displayed on the LCD, the instrument is ready. The current time appears on the upper left side of the LCD.
- Press the Cal button to initiate the calibration procedure.

Note: A calibration is recommended before starting a new series of measurements.

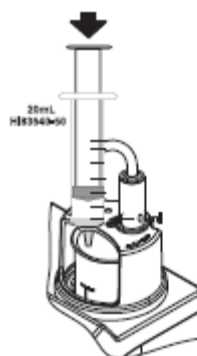
- Use the 60 mL syringe to add 60 mL of HI 83540-55 calibration solution to the beaker. Follow the procedure described in the "TIPS FOR AN ACCURATE MEASUREMENT" section.
- Place a stir bar in the beaker, immerse the clean dry probe and close the cap. Dislodge air bubbles that may adhere the inside of the probe.

Note: Make sure to remove the protective rubber ring between the yellow body and the glass before using.

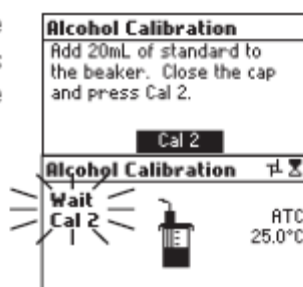
- Press Start and the calibration sequence will start.
- Press the Cal1 button. When the "Wait Cal1" message window is blinking the meter is measuring. When the reading is stable the Cal2 button appears.
- If the "Wrong standard" message is displayed the calibration procedure at Step 1 is outside the expected range. Press Cal1 to repeat the reading. Press ESC to return to the main screen, change the standard and repeat the calibration procedure.
- If the sample measurement failed to stabilize within 2 minutes the following warning message is displayed: "Unstable reading". Verify sensor is submersed in sample and plugged in rear of instrument. Press Cal1 to repeat the reading. Press ESC to return to the main screen.



- Add 20 mL of HI 83540-50 Standard Solution, with the 30 mL syringe, to the beaker using the procedure described in the "TIPS FOR AN ACCURATE MEASUREMENT" section.
- Once the standard solution is added, remove the probeholder from the meter and reattach it. This facilitates mixing.



- Press the Cal2 button. When the "Wait Cal2" message is blinking the meter is measuring. When the reading is stable the second step is successfully completed and the meter automatically returns to the main screen.



- The "Wrong addition" message is displayed if the added standard solution is not correct or the dosed volume is wrong. Press Cal2 to repeat the reading. Press ESC to return to the main screen and repeat the calibration procedure.



- If the sample measurement failed to stabilize within 2 minutes the following warning message is displayed: "Unstable reading". Verify sensor is submersed in sample and plugged in rear of instrument. Press Cal2 to repeat the reading. Press ESC to return to the main screen.



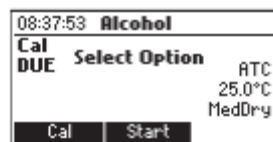
- If the standard solution was not added the following warning message is displayed: "Did not detect an addition". Add the standard solution and press Cal2.



MEASUREMENT PROCEDURE

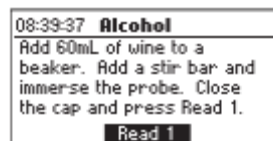
- Turn the instrument **ON** by pressing the **ON/OFF** switch.
- When **"Select option"** message is displayed on the LCD, the instrument is ready. The current time appears on the upper left side of the LCD.

Warning: Before starting a measurement make sure that the proper temperature and sugar compensation methods are selected. This can be done by entering the **SETUP** menu.

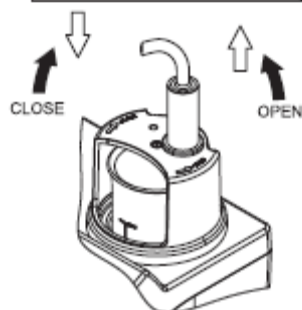


60 mL WINE SAMPLE

- Press the **START** button to start measuring.
- Use the 60 mL syringe to add 60 mL of wine to the beaker. Follow the procedure described in the **"TIPS FOR AN ACCURATE MEASUREMENT"** section.



- Place a stir bar in the beaker, immerse the clean dry probe and close the cap. Dislodge air bubbles that may adhere to the inside of the probe.



- Press the **Read1** button. When the **"Wait Read1"** message window is blinking the meter is measuring. When the reading is stable the **Read2** button appears.



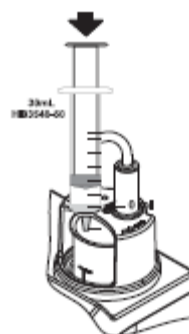
- If the **"Wrong sample"** message is displayed the reading made at Step 1 is outside the expected range. Press **Read1** button to repeat the reading. Press **ESC** to return to the main screen and repeat the procedure.



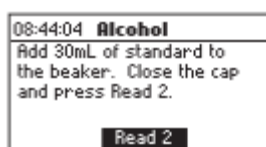
- If the sample measurement failed to stabilize within 2 minutes the following warning message is displayed: **"Unstable reading"**. Verify sensor is submersed in sample and plugged in rear of instrument. Press **Read1** to repeat the reading. Press **ESC** to return to the main screen.



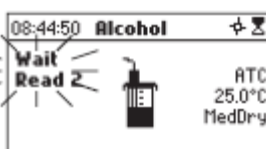
- Add 30 mL of HI 83540-50 Standard solution with the 30 mL syringe to the beaker using the procedure described in the "TIPS FOR AN ACCURATE MEASUREMENT" section.
- Once the standard solution is added, remove the probe holder from the meter and reattach it. This facilitates mixing.



- Press the Read2 button.
"Wait Read2" will blink on the LCD. After the reading was taken the instrument displays the alcohol content on the LCD.



Note: Better measurement accuracy can be obtained if a precise dosing tool such as volumetric pipettes are used for sample and standard additions (instead of the syringes).



- The "Wrong addition" message is displayed if the added standard solution is not correct or the dosed volume is wrong. Press Read2 to repeat the reading. Press ESC to return to the main screen and repeat the calibration procedure.
- If the sample measurement failed to stabilize within 2 minutes the following warning message is displayed: "Unstable reading". Verify sensor is submersed in sample and plugged in rear of instrument. Press Read2 to repeat the reading. Press ESC to return to the main screen.
- If the standard solution was not added the following warning message is displayed: "Did not detect an addition". Add the standard solution and press Read2.



PROBE CONDITIONING & MAINTENANCE

MEASURE

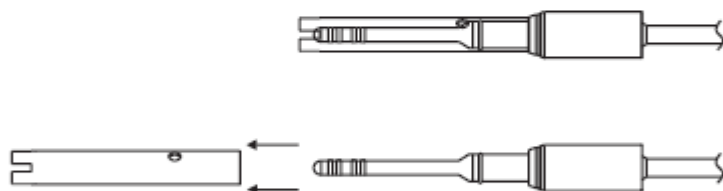
Rinse the probe with distilled or deionized water between measurements and blot dry with a lab wipe. For a faster response and to avoid cross-contamination of the samples, rinse the probe with a few drops of the solution to be tested, before taking measurements. Immerse the probe in the sample and stir for a few seconds.

PERIODIC MAINTENANCE

Inspect the probe and the cable. The cable used for connection to the instrument must be intact and there must be no points of broken insulation on the cable. Connectors must be perfectly clean and dry. After 10-15 measurements and before performing a calibration, clean the electrode with HI 83540-51 electrode cleaning solution. Soak the electrode in 50 ml of stirred HI 83540-51 for 5-10 minutes.

If more cleaning is required, remove the probe sleeve and clean the probe with a cloth or a nonabrasive detergent. Make sure to reinsert the sleeve onto the probe properly and in the right direction. After cleaning the probe, recalibrate the instrument.

The platinum rings are supported on a breakage glass stem. Take great care while handling the probe.



Recommendations for Users

Before using this product, make sure that it is entirely suitable for your specific application and for the environment in which it is used.

Operation of this instrument may cause unacceptable interferences to other electronic equipment, this requiring the operator to take all necessary steps to correct interferences.

Any variation introduced by the user to the supplied equipment may degrade the instrument EMC performance.

To avoid damages or burns, do not put the instrument in microwave ovens. For yours and the instrument's safety do not use or store the instrument in hazardous environments.

ACCESSORIES

REAGENTS

HI 83540-50	Standard solution (3 X 500 mL)
HI 83540-51	Electrode cleaning solution (230 mL)
HI 83540-55	Calibration solution (230 mL)

OTHER ACCESSORIES

HI 76315	Alcohol probe
HI 731319	Stir bar (10 pcs.)
HI 740035	Beaker 100 mL (10 pcs.)
HI 740225	60 mL syringe
HI 740235	30 mL syringe bar
HI 92000	Windows compatible software
HI 710005	Voltage adapter from 115V to 12 Vdc (USA plug)
HI 710006	Voltage adapter from 230V to 12 Vdc (European plug)
HI 710012	Voltage adapter from 240V to 12 Vdc (UK plug)
HI 710013	Voltage adapter from 230V to 12 Vdc (South Africa plug)
HI 710014	Voltage adapter from 230V to 12 Vdc (Australia plug)

WARRANTY

HI 83540 is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to the instructions.

This warranty is limited to repair or replacement free of charge.

Damage due to accident, misuse, tampering or lack of prescribed maintenance is not covered.

If service is required, contact your dealer. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. If the repair is not covered by the warranty, you will be notified of the charges incurred.

If the instrument is to be returned to Hanna Instruments, first obtain a **Returned Goods Authorization Number** from the **Customer Service Department** and then send it with shipment costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

To validate your warranty, fill out and return the enclosed warranty card within 14 days from the date of purchase.

Hanna Instruments reserves the right to modify the design, construction and appearance of its products without advance notice.

SALES AND TECHNICAL SERVICE CONTACTS

Australia:

Tel. (03) 9769.0666 • Fax (03) 9769.0699

China:

Tel. (10) 88570068 • Fax (10) 88570060

Egypt:

Tel. & Fax (02) 2758.683

Germany:

Tel. (07851) 9129-0 • Fax (07851) 9129-99

Greece:

Tel. (210) 823.5192 • Fax (210) 884.0210

Indonesia:

Tel. (210) 4584.2941 • Fax (210) 4584.2942

Japan:

Tel. (03) 3258.9565 • Fax (03) 3258.9567

Korea:

Tel. (02) 2278.5147 • Fax (02) 2264.1729

Malaysia:

Tel. (603) 5638.9940 • Fax (603) 5638.9829

Singapore:

Tel. 6296.7118 • Fax 6291.6906

South Africa:

Tel. (011) 615.6076 • Fax (011) 615.8582

Taiwan:

Tel. 886.2.2739.3014 • Fax 886.2.2739.2983

Thailand:

Tel. 66.2619.0708 • Fax 66.2619.0061

United Kingdom:

Tel. (01525) 850.855 • Fax (01525) 853.668

USA:

Tel. (401) 765.7500 • Fax (401) 765.7575

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*For e-mail contacts and a complete list of Sales and Technical offices, please see
www.hannainst.com.*